Claims

1. A road information provision system comprising:

a road information provision apparatus for providing a state quantity of road information changing along a road as a function of distance from the reference point on said road; and

a road information utilization apparatus for reproducing the road information on said road from said function.

2. The road information provision system according to claim 1, characterized in that:

said road information provision apparatus provides road section reference data to identify said road together with said road information and that said road information utilization apparatus identifies the target road of said road information from said road section reference data.

3. The road information provision system according to claim 2, characterized in that:

said road information provision apparatus provides data representing a shape data of said road as said road section reference data and that said road information utilization apparatus uses the data representing said shape data to identify the target road of said road information.

4. A road information provision system comprising:

a road information provision apparatus for sampling a state quantity of road information changing along a road in the direction of distance of said road in intervals corresponding to the position resolution of said road information, quantizing said state quantity at each sampling point in accordance with the traffic representation resolution representing the number of available states of said road information, encoding the obtained value and providing the encoded value; and

a road information utilization apparatus for decoding said encoded value to reproduce the road information on said road.

5. The road information provision system according to claim 4, characterized in that:

said road information provision apparatus performs sampling equidistantly in the direction of distance of said road.

6. The road information provision system according to claim 4, characterized in that:

said road information provision apparatus performs sampling in the positions of component points of the shape data representing said road or at an arbitrary point on the link between the component points.

7. A road information provision system comprising:

a road information provision apparatus for sampling a state quantity of prediction information of road information changing along a road in the direction of distance of said road, quantizing said state quantity at each sampling point, encoding the obtained value and providing the encoded value; and

a road information utilization apparatus for decoding said encoded value to reproduce the prediction information of the road information on said road.

8. The road information provision system according to claim 4, characterized in that:

said road information provision apparatus dynamically modifies at least one of said position resolution and traffic representation resolution accordance with the transmit data volume of the traffic information to be provided.

9. A road information provision system comprising:

a road information provision apparatus for sampling a state quantity of road information or prediction information changing along a road in the direction of distance of said road, converting said state quantity at each sampling point to a value having statistical

deviation, encoding the obtained value and providing the encoded value; and

a road information utilization apparatus for decoding said encoded value to reproduce the road information or prediction information on said road.

10. A road information provision system comprising:

a road information provision apparatus for sampling a state quantity of road information or prediction information changing along a road in the direction of distance of said road, quantizing said state quantity at each sampling point, converting said state quantity at each sampling point to a value having statistical deviation, encoding the obtained value and providing the encoded value; and

a road information utilization apparatus for decoding said encoded value to reproduce the road information or prediction information on said road.

11. The road information provision system according to claim 9 or 10, characterized in that:

said road information provision apparatus obtains the difference from said value in an adjacent quantization-unit to convert said value in the target quantization-unit to a having statistical deviation.

12. A road information provision system comprising:

a road information provision apparatus for sampling a state quantity of prediction information of road information changing along a road in the direction of distance of said road, representing said state quantity at each sampling point by a difference value from a state quantity at said sampling point in an adjacent time zone, quantizing said difference value, encoding the quantized value and providing the encoded value; and

a road information utilization apparatus for decoding said encoded value to reproduce the prediction information of the road information on said road.

13. A road information provision system comprising:

a road information provision apparatus for sampling a state quantity of road information or prediction information changing along a road in the direction of distance of said road, transforming said state quantity at each sampling point to a coefficient value of a frequency component by way of orthogonal transformation, encoding said coefficient value and providing the encoded value; and

a road information utilization apparatus for decoding said encoded coefficient value to reproduce the road information or prediction information on said road.

14. A road information provision system comprising:

a road information provision apparatus for sampling a state quantity of prediction information of road information changing along a road in the direction of distance of said road, transforming said state quantity at each sampling point to a coefficient value of a frequency component by way of orthogonal transformation, encoding said coefficient value and providing the encoded value; and

a road information utilization apparatus for decoding said encoded value to reproduce the prediction information of the road information on said road.

15. A road information provision system comprising:

a road information provision apparatus for sampling a state quantity of prediction information of road information changing along a road in the direction of distance of said road, representing said state quantity at each sampling point by a difference value from a state quantity at said sampling point in an adjacent time zone, transforming said state quantity at each sampling point to a coefficient value of a frequency component by way of orthogonal transformation, encoding said coefficient value and providing the encoded value; and

a road information utilization apparatus for decoding said encoded coefficient value to reproduce the prediction information of road information on the road.

16. The road information provision system according to any one of claims 13 through 15, characterized in that:

said road information provision apparatus quantizes said coefficient value of each frequency so that said coefficient value of a high frequency will show statistical deviation and performs variable length encoding on the obtained value.

17. The road information provision system according to any one of claims 13 through 15, characterized in that:

said road information provision apparatus quantizes said coefficient value of each frequency with said coefficient value of a high frequency being deleted.

18. The road information provision system according to any one of claims 13 through 17, characterized in that:

said road information provision apparatus dynamically modifies the position resolution corresponding to the interval between said sampling points in accordance with the transmit data volume of the traffic information to be provided.

19. The road information provision system according to claim 16, characterized in that:

said road information provision apparatus dynamically modifies the traffic representation resolution

corresponding to the coarseness of said quantization in accordance with the transmit data volume of the traffic information to be provided.

20. The road information provision system according to claim 17, characterized in that:

said road information provision apparatus dynamically modifies the number of coefficient values of said high frequency to be deleted in accordance with the transmit data volume of the traffic information to be provided.

21. The road information provision system according to claim 8, 18, or 19, characterized in that:

said road information provision apparatus modifies said position resolution or traffic representation resolution of said road information in accordance with the importance of the traffic information or target road.

22. The road information provision system according to claim 8, 18, or 19, characterized in that:

said road information provision apparatus modifies said position resolution or traffic representation resolution of said road information in accordance with the distance from a point on the target road of traffic information where information is provided.

23. The road information provision system according to a claim 8, 18, or 19, characterized in that:

said road information provision apparatus modifies said position resolution or traffic representation resolution of road information on a road off the recommended path so that said position resolution or traffic representation resolution will be lowered.

24. The road information provision system according to any one of claims 13 through 16, characterized in that:

the data obtained by encoding the coefficient value of a low frequency component of a plurality of roads prior to the data obtained by encoding the coefficient value of a high frequency component.

25. The road information provision system according to any one of claims 13 through 16, characterized in that:

said road information provision apparatus provides the data obtained by encoding the coefficient value of a low frequency component from a first medium and provides the data obtained by encoding the coefficient value of a high frequency component from a second medium.

26. The road information provision system according to any one of claims 4 through 25, characterized in that:

said road information provision apparatus smoothes said state quantity at said sampling point then proceeds to next processing.

27. The road information provision system according to any one of claims 1 through 26, characterized in that:

said road information provision apparatus provides, when providing road information at the current time, difference data from road information provided in the past.

28. The road information provision system according to any one of claims 1 through 27, characterized in that:

said road information provision apparatus provides said road information over a wireless channel or wired line.

29. The road information provision system according to any one of claims 1 through 28, characterized in that:

said road information provision apparatus records said road information onto a recording medium and provides the recording medium.

30. The road information provision system according to any one of claims 1 through 29, characterized in that:

said road information provision apparatus, in response to a request for said road information, provides

said road information on the requested road or area.

31. The road information provision system according to any one of claims 1 through 30, characterized in that:

said state quantity of said road information is a travel speed, a travel time or a congestion situation.

32. The road information provision system according to claim 1 or 3, characterized in that:

said road information provision apparatus is a probe car for providing measurement information measured during travel and that said road information utilization apparatus is an information collector for collecting said measurement information from said probe car.

33. A road information generation apparatus comprising:

a road information converter for sampling a state quantity of road information changing along a road in the direction of distance of said road in intervals corresponding to the position resolution of said road information and quantizing said state quantity at each sampling point by using a quantization table;

an encoder for encoding, by using an encoding table, the data processed by the road information converter;

a quantization-unit determination unit for

determining an interval corresponding to said position resolution in accordance with the state of collection of road information and selecting the quantization table used by the road information converter and the encoding table used by the encoder; and

an information transmitter for transmitting the data encoded by the encoder.

34. A road information utilization apparatus comprising:

an information receiver for receiving road information represented by a function of distance from the reference node of a shape data indicating the road and the data representing said shape data; and

a map matching section for performing map matching by using the data representing the shape data to identify the target road of road information.

35. A road information generation method comprising the steps of:

sampling a state quantity of road information changing along a road in the direction of distance of said road in intervals corresponding to the position resolution of said road information;

quantizing said state quantity at each sampling point in accordance with the traffic representation

resolution representing the number of available states of said road information;

converting said state quantity obtained to a value having statistical deviation; and

encoding the obtained value to generate road information.

36. A road information generation method comprising the steps of:

sampling a state quantity of road information changing along a road in the direction of distance of said road in intervals corresponding to the position resolution of said road information;

transforming said state quantity at each sampling point to a coefficient value of a frequency component by way of orthogonal transformation;

quantizing said coefficient value to obtain a value having statistical deviation; and

encoding said post-quantization coefficient value to generate road information.

37. A program which causes a computer to perform the steps of:

determining an interval of sampling of road information and the coarseness of quantization in accordance with the state of collection of road

information;

sampling the state quantity of said collected road information in the direction of distance of the road in said intervals;

quantizing said state quantity at each sampling point by using a quantization table corresponding to said coarseness of quantization; and

coding/compressing the quantized value.

38. A program which causes a computer to perform the steps of:

determining an interval of sampling of road information and the coarseness of quantization in accordance with the state of collection of road information;

sampling the state quantity of said collected road information in the direction of distance of the road in said intervals;

performing orthogonal transformation on said state quantity at each sampling point to obtain a coefficient value of a frequency component;

quantizing said coefficient value by using a quantization table corresponding to said coarseness of quantization; and

coding/compressing the quantized value.

39. A recording medium on which are recorded data of road information on a state quantity of road information changing along a road represented by a function of distance from the reference point on said road and road section reference data for identifying said road.